

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

ORIGINAL

In the Matter of)
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Revision of the Commission's)
Rules to Ensure Compatibility)
with Enhanced 911 Emergency)
Calling Services)
)

CC Docket No. 94-102
RM-8143

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COMMENTS OF NORTHERN TELECOM INC.

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

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January 9, 1995

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Summary

As detailed in these comments, Northern Telecom fully supports the goals of this proceeding -- to enhance the compatibility and utility of 911 services as new technologies are deployed. Dispersed private telephone systems such as PBXs should provide information to the PSAPs that will allow them automatically to determine the identity and location of the individual station calling 911. Similarly, for wireless services such as cellular and PCS, the PSAP will be able to call back (or maintain the connection with) the mobile unit and will have a better idea of the caller's location.

In order to best achieve the goals advanced by the Commission, however, Northern Telecom suggests some refinements to the proposals set forth in the E-911 NPRM. As an initial matter, Northern Telecom believes that several of the issues are more complex than apparently assumed in the E-911 NPRM.

"Dispersed private telephone systems" include a wide range of systems with differing capabilities and deployments, ranging from key telephone systems serving a handful of lines to large PBXs capable of serving over 100,000 stations. In addition, Centrex provides equivalent services. The rules should take account of these different systems instead of automatically applying the same requirements "across the board."

The rules proposed for wireless services, including wireless PBXs, also raise numerous complications. For wireless PBXs and wireless services in general, determining the position

and transferring that information to the emergency services providers will require the development and deployment of new technologies and standards. Further complications include the need to coordinate the FCC's requirements with the obligations imposed by the recent digital wiretap legislation, and the need to ensure compatibility with competitive local services networks and the North American numbering plan. Implementation may thus take longer than anticipated by the Commission.

The Commission must also recognize that in addition to modifications to PBXs and wireless networks, it will also be necessary to mandate changes in the telephone networks and to deploy new equipment for the emergency services providers. The most significant changes will involve modifications to the networks to accommodate enhanced information transfer and signalling capabilities.

In order to best achieve the desired goals, Northern Telecom urges the Commission to proceed with some of the aspects of its proposals, and to refer other issues to a negotiated rulemaking committee in those instances where additional work is necessary. Northern Telecom believes that the standards for invoking a negotiated rulemaking are present here, and that such a process should lead to the development of a consensus in a timely fashion.

In the development of requirements for compatibility of dispersed private telephone systems and wireless networks with E-911 services, Northern Telecom suggests that uniform, nationwide standards will best serve the public interest. A single set of

federal standards will lead to manufacturing efficiencies and help ensure interoperability of equipment as it moves about the country.

As detailed in these comments, Northern Telecom suggests some changes to the proposed rules for dispersed private telephone systems set forth in the E-911 NPRM. Northern Telecom urges the Commission to apply some different rules to "large" and "small" systems, with a negotiated rulemaking to address where those distinctions should apply. For example, requirements for dedicated E-911 trunks and detailed verification standards may not be appropriate (or necessary) for small installations.

Northern Telecom also suggests that the Commission cross-reference the appropriate industry standards in its Rules, rather than codifying any particular values. In this manner, the standards can evolve as technology changes without the need to necessarily go through a rulemaking process. Northern Telecom believes that detailing technical signalling standards in the Rules would preclude newer technologies such as SS7 and ISDN BRI/PRI. In addition, with the development of AIN, the E-911 networks as well as the telephone networks themselves are expected to change. The Commission should look to these new technologies as longer term solutions, rather than adapting CAMA signalling, as the means for accommodating the need for increased information transfer capabilities. Northern Telecom also believes that as an alternative solution to the need for call-back capabilities, the Commission should study Called Party Disconnect Control and the development of necessary standards.

Northern Telecom also seeks clarification of some of the proposed requirements, including the necessity for attendant notification and what information must be transmitted "by the PBX." Northern Telecom also suggests that the labelling requirements take into account the fact that typically it is the software, and not the hardware, that determines the capabilities of the equipment.

Northern Telecom also believes that wireless PBXs raise a large set of issues that should be addressed by a negotiated rulemaking committee. It is not clear the extent to which the Commission intends to impose the same types of obligations on this equipment that it proposes for wireless networks generally, since these systems are not CMRS. At any rate, the need to determine and transmit to the PSAP the location of the handset raises numerous technical hurdles. The Commission must ensure that the costs of these proposals do not drive wireless PBXs out of the marketplace.

Likewise, even for CMRS systems, the Commission must balance the benefits from more accurate location information with the costs of obtaining and transmitting that information. Even "limited" access without precise automatic location information is better than no access at all, which would be the case if the prices for the handsets and services are driven beyond the levels customers are willing to pay by imposing unrealistic requirements or implementation timetables.

In light of the significant work that needs to be done in the wireless area, Northern Telecom urges the Commission to

provide adequate time to allow the development of uniform, open standards. This work includes the need to accommodate tens or hundreds of digits of information, which will require signalling capabilities more refined than CAMA. In addition, determining the location of a handset raises difficult technical issues, since there are at least 144 combinations of possible technologies and RF access methods that need to be considered.

Northern Telecom believes that some of the Commission's proposals can be implemented within the timeframes suggested in the E-911 NPRM. Access by only dialling 911 can readily be deployed, although Northern Telecom is concerned if access without any verification is mandated, because of potential fraud and revenue impacts. Northern Telecom also believes that the networks can connect the caller to the PSAP nearest the base station handling the call. Determining the PSAP location nearest the caller itself, however, will require the development of enhanced location capabilities. Likewise, some priority access is possible, although providing priority access from the mobile unit to the base station will require added technological development.

Providing a call back capability will require additional signalling capacity for roamers, although the development of that capacity will also make it possible to provide additional location information. Determining the location in terms of the cell and cell sector can be implemented within the timeframes proposed by the Commission, although some issues with respect to the amount and timing of additional

information should be addressed by a negotiated rulemaking committee. Finally, Northern Telecom believes that it would be appropriate for a negotiated rulemaking committee to explore issues related to the funding of wireless E-911 services.

In sum, Northern Telecom supports the Commission's proposals, although it believes that some changes and clarifications are necessary as detailed in these comments. In addition, Northern Telecom urges the Commission to refer a number of open or unresolved issues to a negotiated rulemaking committee (or committees) as the best means of rapidly achieving a consensus on these issues. In particular, Northern Telecom believes that the following issues should be addressed by the negotiated rulemaking committee(s):

- The appropriate definition of a "small" PBX or key telephone system, and the relaxed requirements that ought to apply to such equipment, including verification procedures and dedicated trunk requirements;
- If the Commission intends to require real-time updating and verification of station moves and changes for large PBXs, the technical standards for the interconnection of the PBXs with the data bases and/or PSAPs;
- The technical standards for modifications to E-911 signalling, including any CAMA enhancements, and as a longer term solution, SS7 and ISDN signalling capabilities;
- As an alternative solution to the need for call-back capabilities, the implementation of Called Party Disconnect Control (including necessary standards development);
- For wireless systems (including wireless PBXs if the Commission intends to impose these obligations on these systems), the technical standards for location requirements (including the need for

three dimensional location) and the transfer of this information to the PSAPs;

- For near-term enhancement of wireless systems, changes to the networks to accommodate 10 digit call-back capabilities for roamers;
- For wireless systems, the technical standards for interconnection to the E-911 tandems or PSAPs;
- For wireless systems, whether (and if so how) access to 911 without any verification should be required;
- For transferring the call to the PSAP nearest the caller, the methods for determining location;
- The technical standards for providing priority RF access from the mobile to the base station;
- Funding issues, including the funding for wireless services and the tariff policies for dedicated E-911 trunks.

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COMMENTS OF NORTHERN TELECOM INC.

Northern Telecom Inc. ("Northern Telecom") hereby comments on the Commission's proposals to amend its Rules to expand the enhanced 911 capabilities of mobile services and private branch exchanges ("PBXs").^{1/} The Commission seeks to ensure that the benefits of 911 services are widely available and not compromised by the introduction of new technologies. In particular, the Commission proposes new rules to govern wireless services and dispersed private telephone systems (including PBXs) to ensure compatibility with 911 and enhanced 911 services.^{2/}

1/ Revision of the Commission's Rules to Ensure Compatibility with Enhanced 911 Emergency Calling Services, FCC 94-237, released October 19, 1994 (hereafter cited as "E-911 NPRM").

2/ Basic 911 services simply transfer the call to the Public Safety Answering Points ("PSAPs"), whereas Enhanced 911 (or E-911) services provide information to the PSAPs on the calling party. For E-911 services, typically the calling number (Automatic Number Identification or ANI) is passed along to the PSAP, and data base inquiries then "translate" that number into the identity and the location/address of the telephone that is being used to call 911. The E-911 NPRM addresses compatibility
(continued...)

Northern Telecom fully supports the goals of this proceeding -- to enhance the utility of E-911 services. Northern Telecom recognizes that E-911 services have the demonstrated capability of saving lives and property. Northern Telecom has been an active participant in many of the industry efforts that seek to further expand the functionality and availability of E-911 services, including the work of the Personal Communications Industry Association ("PCIA"), the Telecommunications Industry Association ("TIA") and the Joint Experts Meeting ("JEM").

Northern Telecom, headquartered in Nashville, Tennessee, is the second largest telecommunications equipment manufacturer in the United States, supplying systems to businesses, universities, local, state and federal governments, the telecommunications industry, and other institutions worldwide. The company employs more than 22,000 people in the United States in manufacturing plants, research and development centers, and in marketing, sales and service offices across the country.

2/ (...continued)

issues with respect to Enhanced 911 services, since these compatibility issues do not arise in the case of basic 911. Most emergency phone systems are now enhanced, although there still remains a not insignificant number of telephone company customers that are served by basic 911 (approximately 15%), or not served by any 911 service (approximately 17%). Deployment of E-911 services is generally governed by the states. In order to ensure the availability of these beneficial services throughout the country, in addition to the steps proposed in the E-911 NPRM, Northern Telecom also urges state and local governments to expand the implementation of E-911 services.

Among its activities in the United States, Northern Telecom is a leading manufacturer of network equipment used by local exchange carriers ("LECs") and interexchange carriers ("IXCs"). Northern Telecom is also a leading manufacturer of PBXs (including wireless PBXs) and key systems, and its central office equipment is used to provide Centrex services which are often substitutable for PBXs. In addition, Northern Telecom manufactures cellular switching and transmission systems, and it will be a supplier of switching and transmission systems for Personal Communications Services ("PCS") as well. Finally, Northern Telecom manufactures data base equipment and telephone operator stations that are utilized by PSAPs.

All of these Northern Telecom product lines may be affected by the Commission's proposed rules to enhance the utility of E-911 services. Thus, Northern Telecom is highly interested in the Commission's proposal to establish new requirements for PBXs and wireless services in order to ensure that these new technologies are fully compatible with E-911 services.

Northern Telecom believes that it is critical that a broad, uniform national model be adopted. Northern Telecom could, in a very rapid fashion, develop proprietary solutions to the concerns of compatibility of E-911 services with PBXs and wireless systems. Presumably other manufacturers could also develop their own proprietary solutions. However, telephone networks are now typically comprised of equipment from multiple manufacturers. In addition, individuals and their customer

premises equipment are relatively mobile, and thus may be interconnected to numerous telephone networks over time. Moreover, with respect to wireless services, customers demand the ability to roam among different systems. Thus, absent a uniform federal policy, differing state requirements or proprietary technological solutions could disrupt the ability of an individual to access E-911 services.

Although it may take somewhat more time to develop uniform national standards for interconnection with the E-911 networks, Northern Telecom believes that the time will be well spent. Such standards will ensure interoperability of equipment throughout the country, so that the benefits of E-911 services are not compromised by the continuing advances in telecommunications technology.

In addition, Northern Telecom believes that the issues are somewhat more complex than envisioned by the Commission in the E-911 NPRM, and that a greater amount of time than provided in the E-911 NPRM will be necessary to address some of these issues. As detailed in these comments, however, Northern Telecom believes that use of the negotiated rulemaking process and the reference of some issues to already active standards setting bodies could help speed the necessary work. Thus, Northern Telecom urges the Commission to move ahead rapidly where possible, but also to provide adequate time for the resolution of issues where that is necessary.

I. THE ISSUES IMPLICATED BY E-911 COMPATIBILITY
ARE MORE COMPLICATED THAN APPARENTLY ASSUMED
IN THE NOTICE OF PROPOSED RULEMAKING

In a number of important respects, the E-911 NPRM fails to consider all of the implications of addressing the compatibility of new technology with the E-911 services being offered today (as well as how they are expected to evolve). Given these complexities, resolution of some issues may need to be deferred beyond the timeframes set forth in the E-911 NPRM. Northern Telecom remains optimistic, however, that the industry will be able to resolve all of the issues in a manner that allows the manifold benefits of E-911 services to be maximized.

The E-911 NPRM discusses "PBXs" in a generic fashion, referring to "dispersed private telephone systems". However, the functions performed by PBXs vary, and may be provided by differing types of equipment. For example, a multi-line business could be served by a PBX, Centrex or a key system, depending on the features desired and the number of stations to be served. The proposed rules do not distinguish among the different degrees of sophistication of the customer premises equipment performing the "PBX" function, and seemingly do not apply to Centrex.

As discussed in greater detail below, Northern Telecom believes that the rules should be more refined and take into account the capabilities of the dispersed private telephone system equipment. Northern Telecom also believes that the rules should apply to Centrex services as well, in order to avoid distorting the competition between Centrex and customer premises

equipment ("CPE") systems. The proposed rules, however, do not appear to adequately consider the differences and similarities of the multiline business customer's equipment (or services).

A second problem with the proposed rules appears to be the failure to consider the implementation of "wireless PBXs." Particularly with the allocation of spectrum for unlicensed PCS, Northern Telecom expects there to be a widespread deployment of PBXs incorporating or accommodating a mobile functionality. Customers want the capability to use their phone (or computers) as they move about within their office building or even among buildings in a campus setting. As such systems become more prevalent, the same complications considered by the Commission with respect to Commercial Mobile Radio Services ("CMRS") may also arise with respect to wireless PBXs.

As Northern Telecom discusses below in its comments on compatibility of wireless systems, Northern Telecom also believes that the E-911 NPRM understates the technical obstacles that will complicate the fulfillment of the Commission's long term goals for wireless systems. Although there are numerous proposals and theoretical models that have been mentioned to address the desire to determine accurately the location of a mobile handset, Northern Telecom is unaware of any such systems that have been actually demonstrated which provide three-dimensional information accurately and efficiently in all environments.^{3/} In addition,

^{3/} For example, use of the global positioning satellite system ("GPS") for determining three-dimensional location would not provide reliable information when the mobile unit is indoors or in some congested urban settings.

accommodating roaming capabilities further complicates the ability to provide accurate information to the PSAPs. While Northern Telecom believes that these technical hurdles can eventually be overcome, the E-911 NPRM appears to understate the difficulty of these problems.

Another factor complicating the adoption of rules to address the E-911 compatibility concern for new technologies is the need to coordinate any obligations imposed by the Commission with the requirements imposed on CMRS providers as a result of the recent digital wiretap legislation.^{4/} The E-911 NPRM does not appear to have considered the requirements of the digital wiretap legislation, which also impact the interconnection of PBXs with the telephone network as well as the capabilities of wireless services to determine the location of handsets.

The E-911 NPRM also may be underinclusive to the extent that it does not appear to address the requirements for E-911 compatibility for competitive local exchange networks. The E-911 NPRM discusses the obligations of "Local Exchange Carriers" to conform to the requirements for E-911 compatibility. However, that term has not traditionally been applied to the services provided by competitive local services companies. While presently there are only a limited number of such companies, their number and size can be expected to increase dramatically in the future. These carriers are not explicitly discussed in the E-911 NPRM. Northern Telecom believes that this is another issue

^{4/} Interception of Digital and Other Communications, Public Law 103-414, 108 STAT. 4279.

that should be considered by the Commission, where a conscious decision could be made whether to apply the same or different E-911 obligations on these competitive carriers.

Finally, there may also be implications for the North American Numbering Plan. If the seven digits transmitted to the PSAP and/or the data base is intended to provide information in addition to the calling party's telephone number, the Commission must ensure that any necessary codes or digits are properly reserved. Moreover, to the extent that a significant number of telephone numbers would need to be assigned in order to ensure that each PBX telephone line is associated with a unique location within a building (or campus), additional strains on the telephone number "resource" would occur. Telephone numbers are a finite resource that in some areas are running out, as the need for "overlay" area codes demonstrates. Thus, a need for North American Numbering Plan coordination is necessary.

Northern Telecom does not believe that these complicating factors need to slow down implementation of all of the contemplated changes. Consistent with the E-911 NPRM's proposal to implement the new requirements in phases rather than all at once, Northern Telecom believes that the consideration of these additional complicating factors need not cause regulatory paralysis. However, the Commission may need to allow additional time to resolve several of the issues, as well as a longer implementation period for some of the changes, in order to accommodate the technical complexity of the solutions. In light of the importance of E-911 services, Northern Telecom believes

that a comprehensive solution that considers all of the relevant issues will benefit the public more than a quick-fix band-aid that seeks only to fix a few of the potential immediate problems.

II. THE COMMISSION MUST CONSIDER THE POSSIBLE
 IMPACT OF E-911 COMPATIBILITY THROUGHOUT
 THE TELEPHONE NETWORK, INCLUDING MODIFICATIONS
 TO CENTRAL OFFICES AND PSAP TERMINALS

The E-911 NPRM largely focuses on two "pieces" of the network for delivering emergency calls to PSAPs -- PBXs and wireless mobile networks. These certainly are important connections that incorporate evolving technology, and their compatibility with E-911 service is important. However, the Commission must also bear in mind other important "links" in the chain connecting an end user to a PSAP. These other elements should also be considered in this proceeding, so that the benefits of E-911 can be maximized.

Under a typical configuration today, a call to E-911 requires not only the initial connection to the network, but also the routing to the appropriate PSAP via an E-911 tandem. In addition, the PSAP will typically receive information regarding the caller from a query to a data base that retrieves information concerning the call (based on the ANI of the calling number) to be able to provide the street address of the caller. Other information concerning the caller (such as more specific location information) may also be provided by the data base.

In the case of a call from a residential customer, the ANI will correspond to the billing number, which will allow the

PSAP to obtain the address through a data base query. That information will be helpful to the emergency services provider, who can use it to confirm the location of the caller (or obtain the information if the caller is unable to provide the location). Of course, even in the case of residential subscribers, the proliferation of cordless telephones (regulated under Part 15) could mean that the customer was several hundred feet away from their home when the call to 911 is made.^{5/}

The problem in the case of calls from a PBX is that the ANI of the PBX may not correspond to the location of the caller, since it will be based on the billing address. For business or large residential PBXs (e.g., apartment buildings), the billing address could very well be out of the area. Alternatively, for a large building or campus environment, identifying the street address may not provide a precise enough location to the emergency services provider to be useful.

The proposed rules would remedy the problem of not being able to associate the ANI with a specific location by requiring the PBX to forward a number for the calling line that would be associated with the specific location of that phone. Northern Telecom believes that such a solution could be

^{5/} The maximum range on residential cordless telephones is as much as 1,000 feet. Thus, a subscriber could in fact be calling from a neighbor's house down the street, although their home address (and not the neighbor's) would be the one to appear on the PSAP screen. In light of the imprecision of the location, as well as the possibility that there could be a mistake in the data base, Northern Telecom understands that PSAP providers generally regard the location provided by the data base as a helpful tool for confirming the location, but they still prefer to obtain that information verbally from the caller.

implemented. However, the Commission must additionally take into account other aspects of the network that may also be affected. In order to achieve the desired compatibility, more than simply changes to the PBXs must be implemented.

In light of the fact that locations within a business may change and stations may be added or deleted, there will be a need to update the relevant databases. Thus, a standard for interconnection from PBXs to the databases must be established if automatic updates are to be accommodated. In addition, to the extent that wireless PBXs are to be integrated into the E-911 system as well, then some other means of identifying the location and providing that information to the PSAPs will be necessary. The location where such information is stored (e.g., within the PBX or in the separate data base) could also impact several aspects of the E-911 network.

To the extent that the required information to specify location in a mobile environment cannot be accommodated by the current system of providing a seven digit number via in-band signalling, then it would be necessary to modify the connections from the telephone company to the PSAP (and/or the connections between the PSAP and the data base). It may also be necessary to upgrade the PSAP equipment as well to accommodate the different or additional information.

In the short term, Northern Telecom believes that some expansion of the in-band multi-frequency ("MF") signalling can readily be accommodated, which will allow the passing of some additional information (such as a ten digit callback number plus

an encoded numeric identifier for cell site/sector).^{6/} Northern Telecom believes this approach has the advantage of requiring little or no modification to PSAP equipment, and no modification to the ALI database systems. Similarly, this interim solution will not require any expensive telephone network upgrades.

Over time, however, Northern Telecom believes that more extensive changes will become necessary. In order to accommodate all of the information the Commission desires with respect to location of wireless handsets, it will be necessary to migrate to an out-of-band signalling system. The Commission should thus make sure that work begins in the necessary standards setting bodies so that Signalling System 7 (SS7) and Integrated Services Digital Network Primary Rate Interface/Basic Rate Interface (ISDN PRI/BRI) can be utilized to support E-911 requirements. To some extent, these capabilities already exist. For example, Northern Telecom's DMS-100 E-911 Tandem supports PRI connection today, and some of the advanced PBXs (including Northern Telecom's Meridian 1 and SL-100) can take advantage of this capability if they interconnect directly to the E-911 tandems.

With respect to the longer term evolution of E-911 (or its successors), the Commission should also seek to develop a path by which the existing "overlay" network supporting E-911 is

^{6/} As discussed in greater detail below, the particular information to be provided and the format for that information should be addressed in a negotiated rulemaking proceeding. Northern Telecom advocates such a process, and intends to participate actively if the Commission convenes a negotiated rulemaking committee.

migrated into the Advanced Intelligent Network ("AIN") model.^{7/} Such a policy will ensure that E-911 equipment does not become obsolete, but instead takes full advantage of the telephone network as it evolves. As the network grows in intelligence, its ability to support and foster E-911 services can expand as well.

With respect to wireless systems such as cellular and PCS, it will be necessary to expand the number of digits transmitted to the PSAP and/or data base in order to provide the information on the location of the calling mobile handset.^{8/} To pass along this additional information, it will be necessary to modify the central office, cellular or PCS switches (depending on where the interconnection between the cellular or PCS switch and the telephone network occurs). It also may be necessary to modify the PSAP equipment to handle the additional information that will be transmitted. Depending on where the information on location will be gathered and stored, it may also be necessary to

^{7/} Northern Telecom envisions that under such a model, wireless and wireline networks would interconnect at the service control point ("SCP") level. Intelligent communication paths (i.e., SS7, ISDN) would carry the required PSAP information, including the subscriber's Calling Line Identification ("CLID"), address information, geographic location information, pertinent site information, and any other desired information. The precise manner in which E-911 would fit into this model cannot be determined at this time, however, because the AIN model is still evolving and developing. However, by starting to examine these issues now, the Commission can ensure that E-911 requirements are fully and economically integrated into the AIN networks as they develop.

^{8/} As a short term solution, it should be possible to transmit the cell within which the mobile handset is transmitting by using only seven digits, although it would not also then be possible to transmit the call-back number without expanding the number of digits transmitted.

alter the data bases and interconnections between the PSAPs and the data bases. Finally, it may be necessary to modify the E-911 tandem switches, to the extent that interconnection between the wireless networks and the E-911 network could occur directly at the E-911 tandem.^{9/}

Based on discussions with PSAPs, Northern Telecom understands that PSAPs want to avoid needing to support myriad interconnections from multiple service providers (i.e., local exchange carrier, competitive local services company, cellular networks, PCS networks, large PBXs). From the PSAPs' perspective, it is much more efficient to receive calls from the telephone networks through a single point of interconnection. Thus, it may also be necessary to configure the E-911 networks and E-911 tandems (or successor equipment under AIN) to connect with additional systems as a means of concentrating calls to the PSAPs through a single point of connection.^{10/}

While not exhaustive, the foregoing discussion demonstrates that in order to fully implement the desired changes to ensure the compatibility between wireless services or PBXs and

^{9/} In the future, as Advanced Intelligent Networks are implemented, the functions performed by "tandems" may be replaced by other equipment. Northern Telecom's references in this pleading to "E-911 tandems" is not intended to limit or preclude such technology as it evolves.

^{10/} A further potential complication concerns the ownership and/or control of the E-911 tandem, which traditionally has been part of the local exchange carrier's network. A related question is the compensation to be provided to all of these networks/service providers to cover the cost of the connections and services. These are issues that could be explored as part of a negotiated rulemaking proceeding or possibly a supplemental notice of proposed rulemaking.

E-911 services, it may be necessary to make changes throughout the network, including upgrades to the PSAP equipment, central offices, data bases and E-911 tandems. While the proposed changes for wireless services and PBXs are necessary to provide compatibility, they will not be sufficient standing alone. Northern Telecom thus urges the Commission to be mindful of the potential need for broader changes throughout the network to ensure interworking of all of the elements of E-911 services.

III. THE COMMISSION SHOULD PROCEED WITH
A PHASED IMPLEMENTATION OF THE RULES

Northern Telecom believes that the task of modifying the Commission's Rules and developing uniform standards is very important as well as highly complex. Northern Telecom also believes that the tasks are manageable. Northern Telecom agrees with the notion contained in the E-911 NPRM of a phased implementation. As discussed in greater detail below, some of the changes to the rules governing PBXs and wireless services could be implemented within a relatively short period of time as contemplated by the Commission. Other changes will require additional time, because there will be a need to develop the necessary standards and to deploy new capabilities.

Northern Telecom thus urges the Commission to move ahead where possible, taking into account the record accumulated to date and in response to the E-911 NPRM. In those areas where additional work is necessary in developing specific rules or